

## **Information Relevant to Helicopter Logging in Grizzly Bear Security/Core Habitat**

### **Scientific Literature**

There is a large body of management guidelines and scientific literature that relate to disturbance effects of aircraft on wildlife generally and grizzly bears specifically.

### **Management Direction for Management Situation 1 Habitat (from the Interagency Grizzly Bear Guidelines, 1986)**

“Grizzly habitat maintenance and improvement and grizzly-human conflict minimization will receive the highest management priority. Management decisions will favor the needs of the grizzly bear when grizzly habitat and other land use values compete. Land uses which can affect grizzlies and/or their habitat will be made compatible with grizzly needs or such uses will be disallowed or eliminated.”

### **Guidance from Grizzly Bear Cumulative Effects Models**

The NCDE West Side model (1987) recognizes low flying aircraft as a disturbance factor for grizzly bears. The model establishes a disturbance coefficient of 0.1, meaning that habitat disturbed by aircraft is only 10% effective. The area of the disturbance is defined as 3.2 km from the flight line or the nearest ridgeline, whichever is closest.

The NCDE East Side model (1986) recognizes low flying aircraft (<1500 ft.) as a disturbance to grizzly bears, with the disturbed habitat also being only 10% effective. The influence zone is defined as 1.0 mi. on each side of the flight path.

The Selkirk/Cabinet-Yaak model (1988) identifies low elevation aircraft use as a disturbance to grizzly bears. Such activities are assigned a disturbance coefficient of 0.1 (10% effective habitat) with a zone of influence of 1.0 miles each side (2 mi. corridor).

The Yellowstone model (nd) identifies recurring low elevation (<500m) aircraft flights as a motorized linear high use disturbance. It assigns a disturbance coefficient of 0.7 and a distance of 0.5 mi. or the nearest ridgeline in habitats with cover. In non-cover habitats, it assigns a disturbance coefficient of 0.6 and a distance of 2.0 mi. or the nearest ridgeline.

The Unified cumulative effects model (1990) recognizes repeated flights by any type of aircraft at low elevations (<1500 ft.) as a disturbance to grizzly bears. Examples listed include seismic exploration, military training, commercial and private sightseeing. A zone of influence of 1.0 mi. on each side of flight corridors is identified. Disturbance coefficients are left to each ecosystem to establish.

### **Other Ecosystem-specific Direction**

#### ***Selkirk and Cabinet-Yaak Ecosystems***

From the Forest Plan Access Amendments ROD (2004) – “there shall be no permanent net loss of core habitat in any BMU and core area (the amount required by the standard) and any newly created core habitat in these BMUs [must] stay in place for 10 years....”

From the Forest Plan Access Amendments BO Mandatory Terms and Conditions (2004) – “Core habitat within BMUs shall not be impacted (i.e. shifted, moved, etc.) by activities

more frequently than once every 10 years....” “[I]mpacts to or losses of existing core habitat within individual BMUs shall be compensated for with in-kind replacement of core habitat concurrently with or prior to incurring the impacts to or loss of the existing core habitat.”  
“No permanent net losses of core habitat shall occur within any individual BMU.”  
“Temporary reductions of core habitat within individual BMUs shall not decrease core habitat below the minimum core habitat standard....”

### ***Yellowstone Ecosystem***

From the Yellowstone Conservation Strategy -

P.7. and P. 41. Secure [core] habitat is defined as more than 500 meters from an open or gated motorized access route or reoccurring helicopter flight line and must be greater than or equal to 10 acres in size.

P. 41. Activities allowed in secure [core] habitat: activities that do not require road construction, reconstruction, opening a restricted road, or reoccurring helicopter flights.

From the Yellowstone Forest Plan Amendments ROD -

P. 16. and P. 51. Secure [core] habitat is defined as areas greater than or equal to 10 acres in size and more than 500 meters from an open or gated motorized access route or recurring helicopter flight line.

P. 45. Acceptable activities in secure [core] habitat: activities that do not require road construction, reconstruction, opening a permanently restricted road, or recurring helicopter flight lines at low elevation do not detract from secure [core] habitat.

The Yellowstone Conservation Strategy and Forest plan Amendments allow a temporary 1 percent reduction in core habitat within certain spacial and temporal sideboards. This could include helicopter logging.

### **Examples and Additional Information Provided by the National Forests**

Twelve National Forests were queried regarding their policies and history of helicopter logging in secure core grizzly bear habitat. Eight of these Forests responded as follows.

***All Forests:*** Forests typically allow one-time or short-term helicopter use in secure habitat with no deduction in core. Examples include search and rescue, site maintenance, prescribed fire, administrative flights, etc.

***Beaverhead-Deerlodge:*** Has never done any helicopter logging in core grizzly bear habitat.

***Bridger-Teton:*** Has never done any helicopter logging on the Forest, either inside or outside grizzly bear habitat.

***Caribou-Targhee:*** Has never done any helicopter logging in secure core habitat. Most of the secure habitat is outside the suitable timber base and no logging or other vegetation treatments are anticipated. For the portion that is within the timber base, the Forest Plan is prescriptive regarding concentrating activities in time and space. Once bears are delisted in the Yellowstone ecosystem, management would be in accordance with the Conservation Strategy and Forest Plan Amendments (see above).

***Colville:*** The Z-Slumber EA (1998) included two timber sales with about 100 acres of helicopter logging green timber in core habitat. Prior to the sale, additional core was created

by permanently closing roads in order to offset the loss of core. The BA made a “not likely to adversely affect” determination, and USFWS concurred. The EA was litigated based on no incidental take statement for the Forest. USFWS issued an amended BO on the Forest Plan.

**Flathead:** No helicopter logging has occurred in core habitat except for fire salvage. On the Robert fire salvage timber sale (2004), helicopter logging was proposed on 23 of 87 units. Three of these units would occur in core grizzly bear habitat during the non-denning season. On the Wedge fire salvage timber sale (2004), helicopter logging was proposed on 29 of 79 units. All 29 units would occur in core grizzly bear habitat during the non-denning season. The sales were determined by the Flathead NF to be “likely to adversely affect” the grizzly bear, with helicopter logging in core habitat being one of the contributing factors. The USFWS BO found, “there may be disturbance effects from helicopters, but there will be no decrease in security core habitat during project implementation.” USFWS issued a non-jeopardy opinion on the projects.

The Forest Service and USFWS were sued on the projects by Swan View Coalition and Friends of the Wild Swan. Logging in core habitat was one of numerous issues presented in the suit. The court issued a temporary restraining order (TRO) prohibiting logging in core habitat until a final judgement could be made. The Forest later filed a motion for removal of the TRO and was granted a removal only during the bear denning season (through April 1). The Forest filed a second motion for complete removal of the TRO, which was granted in September 2006. This case is a good example of a court ruling based on procedural issues rather than the environmental merits or effects of a proposed action. A district court “may not substitute its judgment for that of the agency concerning the wisdom or prudence of a proposed action.” In this case, the Flathead acknowledged that their actions would adversely affect grizzly bears, but they procedurally did everything correctly, so there was no basis for a TRO. The final ruling on the merits of the case are still pending.

**Gallatin:** Has done no helicopter logging in core habitat. If any were proposed, would need to be consistent with the Conservation Strategy and Forest Plan Amendments (see above).

**Idaho Panhandle:** Proposed helicopter logging green timber in core habitat on a portion of the Boundary timber sale. No mitigation for loss of core was included in the proposal. The BA found a “not likely to adversely affect” and USFWS concurred based on likelihood bears would not be present on the low elevation dry site during the summer logging period. Sale was litigated and a settlement agreement specified that formal consultation with USFWS would occur. USFWS changed their position and now says sale “is likely to adversely affect” based on incomplete data on bear/habitat use in the area.

Helicopter logging is proposed in core habitat on a green timber sale in Myrtle Creek. No mitigation for loss of core is planned. The Forest would like to make a “not likely to adversely affect” determination in the BA.

**Kootenai:** Used helicopters to salvage log after the 1994 fires. The BA was “likely to adversely affect”, and formal consultation occurred. Equivalent acreage of replacement core was provided for core acres lost due to logging operations.

Sinclair Heli timber sale was helicopter logged in 2001-02. This green sale was winter logged in core habitat in a portion of the NCDE. Mitigation included closing a road to increase core habitat and reduce OMRD. The BA effects determination was not likely to adversely affect, and USFWS concurred.

Helicopter logging is proposed in the Miller West Fisher sale (still in planning). Logging would occur during the period of year when bears are denning, and a “not likely to adversely affect” determination is anticipated.

***Lewis and Clark:*** Has never proposed or conducted any logging in core areas, either with helicopters or ground-based equipment.

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## Summary

All Forests allow temporary, short-term helicopter use in core grizzly bear habitat, and USFWS concurs that this type of activity is “not likely to adversely affect” grizzly bears.

Several Forests have done no helicopter logging in core habitat. A few Forests have done helicopter logging of fire-killed timber in core. A few Forests have either done or propose helicopter logging green timber in core.

The available science indicates (and we have codified it in our cumulative effects models) that repeated, low elevation helicopter flights, such as occurs with helicopter logging operations, potentially have negative disturbance and displacement effects on grizzly bears. Therefore, a “likely to adversely affect” determination is appropriate for these activities unless there are extenuating circumstances. (Per ESA, the effects determination applies to any individual grizzly bear, not to the population as a whole). Some Forests have mitigated these negative effects when proposing helicopter logging by providing replacement core habitat prior to the logging. Scheduling logging during periods when there is assurance that bears will not be using the habitat may also be an appropriate mitigation. This might include the denning season, or other seasons of no bear use, but solid data is required to confidently state that bears will not be using the area.

To date, nearly every timber sale involving helicopter logging in core grizzly bear habitat has been litigated (not always on the core issue). When core loss has been appropriately mitigated, we have generally prevailed in these suits. When core loss has not been mitigated, we have either settled the cases, been restrained from logging in core, or the cases are still pending.

**Attachment: Examples of scientific literature dealing with the effects of aircraft on grizzly bears and other wildlife.**

**Corrected:**

**Reynolds, P.E., H.V. Reynolds, and E.H. Follman. 1986. Responses of grizzly bears to seismic surveys in northern Alaska. International Conference on Bear Research and Management 6:169-175.**

- Heart rates measured the same during mid-winter small fixed-wing aircraft over flights (500-700 meters above ground) as during undisturbed conditions.
- Just prior (3 days) to den emergence heart rate increased with small fixed-wing aircraft over flight (150 meters above ground).
- After den emergence responses included increased heart rate, running into den, sitting and looking up, lie down, walk away with small fixed-wing aircraft over flights (100 meters above ground).

**Larkin, Ronald P. 19\*\*. Effects of military noise on wildlife: a literature review.**

- Helicopters usually elicit more vigorous behavioral responses and/or responses at greater distances than fixed-wing aircraft (Watson 1993). (p.37)
- Grizzly bears react very strongly to aircraft, often starting to run while the aircraft was some distance away. As aircraft over takes running bears they veer sharply away from the aircraft flight path. (p. 18).

**Hamilton, Dennis and Steve Wilson. 2001. Access management in British Columbia: a provincial overview. Ministry of Environment, Lands and Parks Habitat Protection Branch, Victoria, B.C. and Nanuq Consulting Ltd. Nelson, B.C. 29 pp.**

- Aircraft impacts involve two categories: over flights, and flights involving landings. Potential for impacts is greater when aircraft land, because aircraft make closer approaches to animals. (p. 16)
- Most studies of the effects of aircraft have measured short-term behavioral reactions (p.17).
- Impacts from aircraft activity could include: habitat impacts from fuel deposits and spills; wildlife impacts in the form of harassment and poaching.

**Efroymsen, Eebecca A., W.H. Rose, S. Nemeth, G.W. Suter II. 2000. Ecological risk assessment framework for low-altitude over flights by fixed-wing and rotary-wing military aircraft. U.S. Department of Defense Strategic Environmental Research and Development Program. Environmental Sciences Division. Publication No. 5010. 115 pp.**

- Defines low-level as below 1500 feet above ground level (p.21)
- Identifies stressors from aircraft over flights as sound of aircraft, sight of aircraft, air movement from aircraft take off and landings

- Caribou calf survival negatively correlated with over-flights less than 1 km (0.6 miles) from animal location (p. 48)
- Mtn Goats show at least moderate reaction to helicopter flights even at horizontal distances from flight path greater than 1500 meters (0.9 miles) (p.63)
- Slant distance is probably a better measure of exposure than sound (p.78)
- Mountain sheep changed use of vegetation types following exposure to helicopter over flights, suggesting potential impacts on growth (p.78)
- Caribou nursed less frequently when exposed to over flights (p.78)
- Behavioral effects of over flights related to animal movement, which may be related to abundance and production. Energy loss is an important predictor of production. If movement associated with over flights is combined with other high energy activities, growth may be impaired. Movements to new habitats alter abundance of local population, as well as potentially lowering foraging success. (p.79)
- Response to over flights is dependent on the activity that the animal is engaged in at the time. (p.79)
- Slant distance thresholds for ungulate behavioral effects from aircraft (p. 95)

**Harper, W.L., D.S. Eastman. 2000. Wildlife and commercial backcountry recreation in British Columbia: assessment of impacts and interim guidelines for mitigation. Wildlife Branch Ministry of Environment, Lands and Parks, Victoria, British Columbia. 80 pp.**

- Risk of impact to grizzly bear from helicopters is very high (p. 13)
- Aircraft disturbance of wildlife becomes a serious issue when frequency of aircraft disturbance is high. (p. 15)
- Limit helicopter and fixed-wing flight altitudes to a minimum of 300 meters over grizzly bear habitat. (p. 36)

**USDI Glacier National Park. 2003. Environmental assessment to conduct additional administrative helicopter and fixed-wing flights in 2003. USDI National Park Service, GNP, West Glacier, MT. 49 pp.**

- Specifies mitigation measures (p.10):
  - Helicopters fly at a minimum of 500 feet above ground level
  - Fixed wing aircraft fly at a minimum of 500 feet above ground level
- Identified minor to moderate short-term, site-specific and local adverse effects to grizzly bears IF individual animals flee from aircraft or are displaced from favorable foraging sites. (p.15)
- Provides impact threshold definitions: negligible, minor, moderate, major and defines duration: short and long term. (p.28)
- Provides detailed grizzly bear effects analysis (p.31-33)
- Aircraft over flights at altitudes above 500 feet did not elicit a panic response (p.32)

**Bleich, Vernon C., R. T. Bowyer, A.M Pauli, R.L. Vernoy, and R.W. Anthes. 1990. Responses of Mountain Sheep to Helicopter Surveys. California Fish and Game 76(4): 197-204.**

- Mountain sheep altered both distribution and movements in response to helicopter surveys. (p.201)
- Long distance movements as well as changes in distribution begin at the onset of helicopter surveys. (p.201)

**IGBC. 1987. Grizzly Bear Compendium. National Wildlife Federation, Washington D.C. 540 pp.**

- Grizzly bears react strongly to both fixed-wing aircraft and helicopters (p. 71)
- Bears already fleeing aircraft when first spotted, including 1.0 miles distance and several at ½ mile. (p.71)
- Grizzly bears may be more sensitive to helicopter disturbance than fixed-wing aircraft (p.71)

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**Mountain Goat Responses to Helicopter Disturbance**

Steeve D. Cote

*Wildlife Society Bulletin*, Vol. 24, No. 4 (Winter, 1996), pp. 681-685

This article consists of 5 page(s).

**Abstract**

Mountain goat (*Oreamnos americanus*) responses to helicopter traffic were investigated at Caw Ridge (Alberta) from June to August 1995. A population of 109 marked individuals inhabited the ridge during the study. As measured by their overt responses, mountain goats were disturbed by 58% of the flights and were more adversely affected when helicopters flew within 500 m. Eighty-five percent of flights within 500 m caused the goats to move >100 m; 9% of the flights >1,500 m away caused the goats to move similar distances. Helicopter visibility and height above ground, number of goats in the group, group type (bachelor or nursery), and behavior of groups just prior to helicopter flights did not appear to influence reactions of goats to helicopters. Helicopter flights caused the disintegration of social groups on  $\geq 5$  occasions and resulted in 1 case of severe injury to an adult female. Based on these observations, restriction of helicopter flights within 2 km of alpine areas and cliffs that support mountain goat populations is recommended.

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Rebecca A Efroymsen, Glenn W Suter II (2001)

Ecological Risk Assessment Framework for Low-Altitude Aircraft Overflights: II.

Estimating Effects on Wildlife

Risk Analysis 21 (2), 263–274.

**Abstract**

An ecological risk assessment framework for aircraft overflights has been developed, with special emphasis on military applications. This article presents the analysis of effects and risk characterization phases; the problem formulation and exposure analysis phases are presented in a companion article. The framework addresses the effects of sound, visual stressors, and collision on the abundance and production of wildlife populations. Profiles of effects,

including thresholds, are highlighted for two groups of endpoint species: ungulates (hoofed mammals) and pinnipeds (seals, sea lions, walruses). Several factors complicate the analysis of effects for aircraft overflights. Studies of the effects of aircraft overflights previously have not been associated with a quantitative assessment framework; therefore no consistent relations between exposure and population-level response have been developed. Information on behavioral effects of overflights by military aircraft (or component stressors) on most wildlife species is sparse. Moreover, models that relate behavioral changes to abundance or reproduction, and those that relate behavioral or hearing effects thresholds from one population to another are generally not available. The aggregation of sound frequencies, durations, and the view of the aircraft into the single exposure metric of slant distance is not always the best predictor of effects, but effects associated with more specific exposure metrics (e.g., narrow sound spectra) may not be easily determined or added. The weight of evidence and uncertainty analyses of the risk characterization for overflights are also discussed in this article.

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### **Immediate Reactions of Grizzly Bears to Human Activities**

Bruce N. McLellan, David M. Shackleton

*Wildlife Society Bulletin*, Vol. 17, No. 3 (Autumn, 1989), pp. 269-274

This article consists of 6 page(s).

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See Grizzly Bear Compendium 1987 pg. 152 "Aircraft"

Aune and Stivers 1980, 1982, 1983, 1985, USFS 1985c

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### **Literature review – Grizzly Bear (added by B.C.; excerpt from GNP Programmatic Biological Assessment of Administrative Flights (2003).**

Low level flights have the potential to displace and/or disrupt normal behavior patterns of grizzly bears present along flight paths. Several studies have documented the behavioral responses of grizzly bears to various types of aircraft disturbance. A summary of the literature by the Interagency Grizzly Bear Committee (IGBC 1987) concluded that there is wide variability in the reaction of grizzly bears to aircraft disturbances. Factors which may affect the way in which bears respond to aircraft include the degree of habituation to the activity, availability of escape cover, and the type, noise level, altitude, and movements of the aircraft involved. Impacts of aircraft on bears can include possible displacement, or physiological arousal without overt response. Bears may be less likely to flee from aircraft while they are feeding.

Much of the published research on responses of wildlife to helicopter overflights was conducted in Canada and Alaska to determine the impacts of oil and gas exploration on arctic mammals. The plant community, and therefore vegetative cover, is quite different in the open arctic tundra than in Glacier National Park, with the exception of the park's alpine

areas. However, some inferences can be made about animal responses to the noise and sight of an approaching helicopter.

Some studies have indicated that grizzlies may be more sensitive to helicopters than to fixed-wing aircraft (**Harding and Nagy 1980**). During hydrocarbon exploration in the Northwest Territories, 61% of grizzly bear responses to fixed-wing aircraft were “overt” (running or hiding), as opposed to 88% for helicopters (Harding and Nagy 1980).

**McCourt et al. (1974)** noted that grizzly bears in the open tundra of Yukon and Alaska demonstrated greater response to small fixed wing aircraft and helicopters than either moose or caribou, and unlike the ungulates, the grizzly bears did not exhibit an increase in response with decreasing distance from the aircraft. The authors recommend avoiding low level flights over areas with known grizzly bear concentrations, and avoiding circling or hovering over bears with helicopters. They also recommend a 1,000-foot AGL minimum altitude for aircraft flying over open habitats.

Of 17 grizzly bear responses to helicopters used during hydrocarbon exploration activities in the Northwest Territories, 15 were “overt” (running or hiding), suggesting aversion and energy expenditure (Harding and Nagy 1980). These bears were accustomed to aircraft in the area, and some had been tranquilized and captured from the air; these bears appeared to have learned to avoid approaching aircraft by hiding or running away.

**Kendall (1986)** documented that 81% of grizzlies observed during low-level helicopter flights in the Apgar Mountains of GNP displayed a strong reaction. A “strong” reaction was defined as a bear moving faster than a slow walk, while a “mild” reaction was indicated when a bear did not move at all or slowly walked as the helicopter approached.

**Aune and Kasworm (1989)** monitored radio-collared grizzly bear movements in response to oil and gas exploration and seismic activities from 1980 to 1984, in an area along Montana’s Rocky Mountain East Front where bears have not likely habituated to aircraft and human activity. The seismic surveys were helicopter supported programs using a surface charge (blast) to measure seismic response of the subsurface. Aircraft flying within 1 km of a collared bear caused the bear to react, and seismic activities caused temporary displacement of bears, but the seismic activities did not cause the bears to be displaced from home ranges.

Researchers in Yellowstone (**Graham 1978**) and Glacier (**Peacock 1978**) National Parks observed that grizzlies often fled into timber when approached by fixed-wing aircraft.

**Schleyer (1980)** noted that grizzlies on day beds were not disturbed by fixed-wing aircraft monitoring flights.

During radio-tracking of bears in SE Alaska from a small fixed-wing aircraft, **Schoen et al. (1987)** noted that some bears became active when the aircraft flew over their dens at an altitude of about 150m. Some bears in the arctic tundra of NE Alaska abandoned den construction due to helicopter disturbance, although most bears in this study apparently returned to the den or entered a new den (**Quimby 1974**). The denning season in GNP begins in October/November. Because of the tendency of grizzly bears in GNP to be more active during daylight hours in the fall than in spring or summer, fall flights could have a greater impact on bears.

**Klein (1974)** reviewed the potential energy losses of animals due to reactions to aircraft overflights. He found that at altitudes above 500 feet, no panic response was observed. He suggested that under extreme weather or stress conditions, the net result of several overflights

could be deterioration in the condition of the animals. While his studies focused on caribou on the tundra, repeated stresses on any species can accumulate to cause a negative effect on the animals. Since the proposed flights will not be frequent and will only be at low levels for short periods, they are not expected to add extreme amounts of stress to grizzly bears in the park.

Although the total number of flights over the park in 2003 is large, the flights will be spread out over the park and will occur at various times, leaving plenty of space for relocation of disturbed animals. Areas for displacement are not always available to a bear, due to occupation by another bear, but this is relatively unlikely. In frequently disturbed locations, animals may be habituated to aircraft activities. The helicopter flights are to developed locations that may already experience some level of human activity. Fixed-wing flights can occur over any area of the park, but the effects of fixed-wing aircraft are believed to be less severe than helicopters.

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[Goldstein et al. 2005. goats, helicopters. Wildl. Soc. Bull 33 \(2\) pg688](#)

Aune, K. and W. Kasworm. 1989. East Front Grizzly Bear Study, Montana Fish, Wildlife and Parks. Helena, MT. 332 pp.

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Yukon and Alaska, 1972. Arctic Gas Biological Report Series, Renewable Resources Consulting Services Ltd. 5:181-222.

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